

## GENDER-DIFFERENTIATED CONTROL AND CHILD AGGRESSION

### Gender Differences in Child Aggression: Relations with Gender-Differentiated Parenting and Parents' Gender-Role Stereotypes

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# GENDER-DIFFERENTIATED CONTROL AND CHILD AGGRESSION

## Abstract

This longitudinal study examines the association between child gender and child aggression via parents' physical control, moderated by parents' gender-role stereotypes in a sample of 299 two-parent families with a three-year-old child in the Netherlands. Fathers with strong stereotypical gender-role attitudes were observed to use more physical control strategies with boys than with girls, whereas fathers with strong counter-stereotypical attitudes toward gender roles used more physical control with girls than with boys. Moreover, when fathers had strong attitudes toward gender roles (stereotypical or counter-stereotypical), their differential treatment of boys and girls completely accounted for the gender differences in children's aggressive behavior a year later. Mothers used more physical control with boys than with girls, irrespective of mothers' gender-role attitudes. Mothers' gender-differentiated parenting practices were unrelated to gender differences in child aggression. Thus, especially fathers' gendered beliefs and parenting foster gendered child development.

*Keywords:* gender stereotypes, gender-differentiated parenting, gender differences, aggression, physical control

### Gender Differences in Child Aggression: Influences of Gender-Differentiated Parenting and Parents' Gender-Role Stereotypes

Higher levels of aggressive behavior in boys than in girls represent one of the most pronounced gender differences found in the literature on child development (Archer, 2004; Hyde, 1984; Loeber, Capaldi, & Costello, 2013). It has been suggested that in addition to potential biological and evolutionary influences (Archer, 2004), these gender differences may arise because of parental differential treatment of boys and girls (Chaplin, Cole, & Zahn-Waxler, 2005; Mandara, Murray, Telesford, Varner, & Richman, 2012). Parents' gender-role attitudes might play a role in the differential treatment of their sons and daughters (Bem, 1981; Eagly, Wood, & Diekmann, 2000), but this mechanism has rarely been studied. Therefore, the current study examined the longitudinal associations between mothers' and fathers' gender-role attitudes, gender-differentiated use of physical control strategies, and gender differences in child aggression. Social role theory and gender schema theory provide rationales for differential parenting of boys and girls, and for the link between gender-differentiated parenting and differences in aggressive behavior of boys and girls (Bem, 1981; Eagly et al., 2000).

#### **Social Role Theory**

According to social role theory (Eagly et al., 2000), gender differences in social behavior arise from prevailing divisions of gender roles in societies, in which females are viewed as homemakers and males as economic providers. This division is still visible in present-day societies; mothers are more likely to be the primary caregivers of young children (Huerta et al., 2013; The Fatherhood Report, 2010), females are overrepresented in educational and nurturing occupations, and males are overrepresented in occupations that are associated with power, physical strength, status, and agentic personality characteristics (i.e., management, engineering) (U.S. Department of Labor, 2009).

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It is proposed that these gender roles lead to stereotypical ideas and expectations about the different nature and behavior of men and women (i.e., gender stereotypes), which lead to differential treatment of men and women, and boys and girls, which in turn leads to gender differences in behavior. When applied to parenting and child aggression, mothers and fathers are expected to use different parenting strategies with boys and girls in accordance with boys' and girls' divergent gender roles. Parenting girls would be more likely to focus on for example affiliation and interpersonal closeness, whereas parenting boys would be more likely to focus on for example assertiveness and dominance, because these characteristics are important to succeed in their respective roles as homemaker or economic provider. Furthermore, parents will teach their sons but not their daughters that aggressive responding is appropriate as part of a set of instrumental behaviors that fit the masculine role of economic provider (Archer, 2004). The link between gender roles and the differential treatment of boys and girls by parents is reflected, for example, in the findings of The Six Culture study (Whiting & Edwards, 1973), showing that in societies where males are more involved in caregiving, boys show more social and nurturing behavior and less aggression. In addition, aggressiveness has been found to be promoted more in boys, and not in girls, through harsh parenting practices, especially in societies at war (Ember & Ember, 1994).

There is also empirical evidence for a link between gender-differentiated parenting and subsequent differences in child behavior. Chaplin and colleagues (2005) showed that fathers attended more to girls' submissive emotions, such as sadness and anxiety, than to boys', whereas they attended more to boys' disharmonious emotions, such as anger and laughing at another, than to girls'. Moreover, they found that parental attention predicted later submissive emotions, and disharmonious emotions predicted later externalizing problems. However, they did not formally test for mediation. In another study the mediating role of parenting on the association between child gender and child behavior was tested, and it was shown that

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mothers were more responsive to girls than to boys in a puzzle game, which was related to more happy, engaged, and relaxed behavior in girls than in boys during the puzzle task (Mandara et al., 2012). However, these associations were tested concurrently, and initial differences between boys' and girls' behavior may have confounded the results.

### **Gender Schema Theory**

It seems unlikely that all parents in a given society would use gender-differentiated control strategies in accordance with the gender roles of that society, because parents' own values, attitudes, and beliefs (i.e., 'ethnotheories') play a directive role in parenting and parenting practices (Super & Harkness, 2002). According to gender schema theory (Bem, 1981) the association between child gender, parenting, and child behavior is likely to be influenced by parents' gender-role stereotypes. When parents have traditional attitudes about gender roles, they are more likely to show gender-differentiated parenting that reinforces gender-role consistent behavior (e.g., reinforcing aggression in boys but not in girls). When parents have counter-stereotypical ideas about the roles of males and females (i.e., female as economic provider, male as caretaker), they might be more likely to show gender-differentiated parenting that reinforces behavior that is inconsistent with gender roles (e.g., reinforcing aggression in girls but not in boys). The fact that the literature on gender-differentiated parenting is inconsistent, with some studies finding no differences, others finding differences in one direction, and still others finding differences in the other direction (see meta-analyses by Lytton & Romney, 1991; Leaper, Anderson, & Sanders, 1998) might be because these studies did not take parents' gender stereotypes into account.

There is some indirect empirical evidence for the moderating effect of parents' gender stereotypes on the differential treatment of boys and girls, showing that mothers' gender stereotypes influence the way they talk about gender with their children (Endendijk et al., 2014; Gelman, Taylor, Nguyen, Leaper, & Bigler, 2004; Friedman, Leaper, & Bigler, 2007).

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However, these studies have focused on one particular aspect of parental gender socialization, i.e., gender talk, and it is yet unknown whether gender stereotypes might also underlie other aspects of gender socialization, such as gender-differentiated parenting.

### **Parental Control Strategies**

One area of parenting that might be especially relevant to the study of gender-differentiated parenting in relation to differences in aggressive behavior between boys and girls is parental use of physical (rather than verbal) control strategies, such as grabbing, pushing, holding, physically redirecting, or spanking (Kochanska, Barry, Stellern, & O'Bleness, 2009). There is evidence that parents use more physical control with boys than with girls (e.g., Kochanska et al., 2009; Kuczynski, 1984; Lytton & Romney, 1991), and the differential use of physical control with boys and girls might partly explain gender differences in children's aggressive behavior. That is, social learning theories submit that the use of physical and harsh control provides a model for aggressive behavior (Bandura, 1977), which has been frequently confirmed in empirical research for both mothers and fathers (e.g., Gershoff, 2002; Kawabata et al., 2011; Rothbaum & Weisz, 1994) in different cultures (Munroe, Hulefeld, Rodgers, Tomeo, & Yamazaki, 2000). Thus, when parents use more physical control strategies with boys than with girls, this might contribute to increased levels of aggressive behavior in boys compared to girls. However, the potential mediating role of parental use of physical control in the association between child gender and aggression has not been examined.

It is important to examine parents' physical control strategies *in response to* noncompliant child behavior. First, physical control generally only occurs when there is a conflict between the wishes of the parent and those of the child (Kochanska et al., 2009). Second, coercion theory predicts that the use of negative control, such as physical strategies, by parents in response to noncompliant behavior will ultimately lead to a downward spiral of

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increasing negative behavior by the child and the parent (Patterson, 1982). In this coercive cycle repeated attempts by the parent to control the child in a negative way will lead to increasingly difficult behavior of the child through modeling (the child imitates coercive tactics and does not learn alternatives). Further, when the parent eventually gives in to the child's difficult behavior, the child is more likely to show more difficult behavior in the future, because the child knows this behavior is effective in getting his or her own way. Third, parents' gender-differentiated use of physical control might only be visible if control is assessed in response to boys' and girls' noncompliant behavior, as opposed to a more global assessment of parents' use of physical control. There is evidence from various cultures that mothers especially differentiate between boys and girls when responding to noncompliant or aggressive child behavior, indicating that they were more likely to react with increasing harsh discipline or control to boys' than to girls' noncompliant or aggressive behavior (McFadyen-Ketchum, Bates, Dodge, & Pettit, 1996; Whiting & Edwards, 1973). Moreover, boys are more likely than girls to react with aggression and negative behavior to parental control, whereas girls are more likely to comply (Bezirgianian & Cohen, 1992; Eron, 1992). Thus, both theory and empirical evidence suggest that parents' gender-differentiated use of physical control *in response to* child noncompliant behavior is most relevant for the development of gender differences in child behavior.

### **The Dutch Family Context**

It might be especially relevant to study the association between gender stereotypes, gender-differentiated parenting practices, and gender differences in child aggression in the Netherlands, as the literature on gender development is dominated by North-American studies. In the Netherlands, gender equality and the participation of mothers in the labor market are relatively high (Huerta et al., 2013; The Fatherhood Report, 2010). For example, 80% of Dutch mothers with 3- to 5-year old children are employed (Huerta et al., 2013) and

the Netherlands was ranked 7<sup>th</sup> on the worldwide gender equality index of 2013 (i.e., reflecting inequality in achievement between women and men in reproductive health, empowerment, and the labor market; United Nations Development Program, 2014). Moreover, Dutch fathers are generally ranked high on father involvement due to government-financed ‘daddy days’ (Cousins & Ning, 2004; Devreux, 2007). Partially paid paternity leave (allowing for 26 weeks of leave before the child’s 8<sup>th</sup> birthday) was introduced in the Netherlands in 2001 (Huerta et al., 2013). Further, both mothers and fathers are highly involved in family life as the Dutch have the highest percentage of part-time workers in the world (men: 19.3%; women: 61.1%; OECD, 2015). However, there is still room for improvement in the Netherlands in terms of sharing child-care responsibilities, paid paternity leave possibilities, and the percentage of fathers taking up paid leave (The Fatherhood Report, 2010).

### **The Current Study**

To shed light on the mechanisms underlying the differential treatment of boys and girls, and the consequences of this differential treatment for children’s problem behavior, the current study examined the links between parents’ attitudes toward gender roles, parents’ gender-differentiated use of physical control strategies and gender differences in child aggressive behaviors. We focus specifically on preschoolers, because the preschool period is an important period for gender development during which the influence of parents is most salient (McHale, Crouter, & Whiteman, 2003). In the Netherlands, most children are with their parents for the majority of the week in the preschool period (the average number of hours in childcare is 19 hours per week; OECD report 2013). We tested the hypotheses that (1) the association between child gender and parents’ use of physical control strategies is moderated by parents’ attitudes toward gender roles, and that (2) for parents with strong gender- role attitudes (strongly stereotypical or strongly counter-stereotypical), their use of



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physical control strategies mediates the relation between child gender and later aggressive behavior in the child. In other words, we expect that parental gender-role stereotypes moderate the indirect effect of child gender, through physical control, on later child aggression (moderated mediation, see Figure 1). We analyze the mediation hypothesis both concurrently (parent and child behavior assessed at same time point; Time 1) and longitudinally (parent behavior at Time 1 predicting child behavior at Time 2 [one year later], controlling for child behavior at Time 1), and separately for mothers and fathers. As these hypotheses are examined in a sample of boys and girls who have a younger male or female sibling, and there is evidence that sibling gender combination influences parent and child behavior (e.g., McHale, Crouter, & Tucker, 1999) we exploratively examine whether the results are different in families with same-sex versus opposite-sex siblings.

We aim to extend previous work on gender-differentiated parenting and gender differences in child behavior by (a) incorporating individual differences in parental gender-role stereotypes into the model, (b) adopting a longitudinal design to control for initial differences in behavior, (c) using observational methods to assess parents' use of physical control strategies in response to children's disobedience. Differential parenting occurs mostly at an unconscious level (i.e., people are generally unaware of their differential treatment of boys and girls, as evidenced by a classic study showing that people unwittingly acted differently with the same baby dressed in pink or blue; Culp, Cook, & Housley, 1983) and is therefore more likely to be captured with observational methods than with self-report measures (Leaper et al., 1998).

### **Method**

#### **Sample**

This study is part of the longitudinal study *Boys will be Boys?* examining the influence of gender-differentiated socialization on the socio-emotional development of boys and girls in

the first 4 years of life. Families with two children in the Western region of the Netherlands were eligible for participation. Families were included if the youngest child was around 12 months of age and the oldest child was between 2.5 and 3.5 years old. Further, families were only included if they were two-parent households, none of the parents or children had a severe physical or intellectual handicap, children were born in the Netherlands, and both parents and children were fluent in the Dutch language. Between April 2010 and May 2011, eligible families were invited by mail to participate in a study with two home-visits each year over a period of 3 years. They received a letter, a brochure with the details of the study, and an answering card to respond to the invitation. The current paper reports on data from the first two time points (Time 1: home visits around first birthday of youngest child, Time 2: home visits around second birthday) and focuses on the oldest child (for more information about the complete sample see Endendijk et al., 2013).

The current study included 299 families (156 boys, 143 girls) with complete data on all study measures (for differences included and excluded families see Appendix A). At Time 1 children were on average 3.01 years old ( $SD = 0.30$ ). At Time 2, children were on average 4.01 years of age ( $SD = 0.30$ ). At Time 1 mothers were aged between 25 and 46 years ( $M = 33.95$ ,  $SD = 3.90$ ) and fathers were between 26 and 63 years of age ( $M = 36.73$ ,  $SD = 5.09$ ). At Time 1 most participating parents were married or had a cohabitation agreement or registered partnership (93%), and the remaining 7% lived together without any kind of registered agreement. With regard to educational level, most mothers (80%) and fathers (75%) had a high educational level (academic or higher vocational schooling). The ethnicity of all participants was Dutch. At Time 2, a third child had been born in 26 (9%) of the families, and parents of two families were divorced. Analyses with and without these families yielded similar results, so these families were retained in the current data set.

### **Materials**

**Implicit association task.** At Time 1 implicit gender-role stereotypes of fathers and mothers were assessed by a computerized version of the Implicit Association Task (IAT); the family-career IAT (Nosek, Banaji, & Greenwald, 2002). This version measures the association of female and male attributes with the concepts of career and family. The IAT is a well-established measure of implicit associations (e.g., Greenwald, Poehlman, Uhlmann, & Banaji, 2009), and previous studies have demonstrated greater predictive validity for gender stereotype IATs compared to self-reports (e.g., Greenwald et al., 2009; Nosek et al., 2009), also in the family context (Croft, Schmader, Block, & Baron, 2014). In our longitudinal study correlations between Time 1 and Time 2 stereotypes were significant (fathers:  $r = .32, p < .01$ ; mothers:  $r = .20, p < .01$ ).

In a pilot study conducted with 114 participants (70% females, age;  $M = 28.73, SD = 14.86$ ) it was tested whether the career attributes of the task (i.e., the words ‘salary’, ‘management’, ‘professional’, ‘corporation’, ‘office’, ‘business’, ‘career’) were equally stereotypic as the family concepts (i.e., the words ‘children’, ‘home’, ‘parents’, ‘family’, ‘marriage’, ‘wedding’, ‘relatives’). Participants had to rate on a 5-point scale how masculine or feminine (1 = masculine, 2 = somewhat masculine, 3 = neutral, 4 = somewhat feminine, 5 = feminine) they evaluated the attribute. Career attributes were rated significantly more masculine ( $M = 2.55, SD = 0.47$ ) than the neutral point of the scale (i.e., 3),  $t(113) = -10.29, p < .001, d = 0.96$ , and family attributes were significantly more feminine ( $M = 3.57, SD = 0.43$ ) than neutral,  $t(113) = 13.93, p < .001, d = 1.30$ . 85% *CI*s of effect sizes for career and family concepts were overlapping (Smithson, 2003), indicating no significant difference in effect sizes. The results were not different for males or females, people with ( $n = 28$ ) or without children ( $n = 85$ ), or for highly educated people ( $n = 31$ , academic or higher vocational schooling) versus lower educated people ( $n = 81$ , less than academic or higher vocational schooling).

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The computer task was built with E-prime 2.0 (Schneider, Eschman, & Zuccolotto, 2002) based on the task on the Harvard Project Implicit demonstration website (<https://implicit.harvard.edu/implicit/>) and the Nosek et al. (2002) paper. The task consists of congruent blocks in which participants are requested to sort career attributes to the male category and family attributes to the female category, and incongruent blocks in which participants have to sort career attributes to females and family attributes to males. They sort the stimuli (i.e., words) by pressing a blue button that corresponds to the male category or a red button for the female category. To reduce possible order effects of the presentation of congruent and incongruent blocks, two precautionary measures were taken (Nosek, Greenwald, & Banaji, 2005): the number of practice trials on the fifth of the seven blocks of the standard IAT procedure was increased, and two versions of the IAT were constructed, one in which the congruent block was first administered and one in which the incongruent block was first administered. As expected, difference scores between the congruent and incongruent blocks were significantly higher on the version that started with the congruent block for both fathers ( $p < .01$ ) and mothers ( $p < .01$ ). The participating families were randomly assigned to one of the two versions so that the mother and father within one family always completed the same version of the IAT. The inclusion of task version as covariate in the current analyses did not change the results. Participants conducted the IAT on a laptop computer. Reaction time and accuracy were automatically recorded for every trial.

The improved scoring algorithm by Greenwald, Nosek, and Banaji (2003) was used to determine each participant's level of implicit stereotypes. The scores are similar to Cohen's  $d$  (i.e., standardized difference between means; Greenwald et al., 2003), so that scores of 0.2, 0.5, and 0.8 can be considered respectively as, low, medium, and high scores. A high positive score represented more difficulties (i.e., a combination of longer reaction times and more errors) to pair male attributes to the family concept and female attributes to the career concept

than to pair female attributes to the family concept and male attributes to the career concept. In other words, higher positive scores represent stronger stereotypical attitudes about the roles of men and women. Negative scores represent counter-stereotypical attitudes about gender roles.

**Parental physical control strategies.** At Time 1 parental physical control strategies were measured during a *don't-touch-task*. During this task the parent was asked to put a set of attractive toys on the floor in front of both children, and to make sure the children did not play with or touch the toys for a period of two minutes. After 2 minutes, both children were allowed to play with only an unattractive stuffed animal (i.e., one dull color, simple shape) for another 2 minutes, after which the task was finished and the children were allowed to play with all the toys.

Parental use of physical strategies in response to child non-compliance were event-coded separately for each child in the 10 seconds after the onset of the occurrence of child-noncompliant behavior (the child reaching for or touching the toys). Physical strategies include holding or pushing the child back, moving the toys out of reach, taking the toys from the child's hand, or blocking the way towards the toys (see Kochanska et al., 2009). More harsh strategies such as spanking or yanking the child's arm away from the toys were also included, but these hardly ever occurred in our sample. The total number of times physical strategies occurred was divided by the total number of non-compliance events to create a relative score for physical control. Scores could range between 0 and 1, indicating the proportion of noncompliant events that were followed by an act of physical control by the parent.

Twelve coders rated the videotapes for parental physical control strategies. All dyads within the same family were coded by different coders to guarantee independency among ratings. A reliability set of 60 videotapes was used to determine inter-coder reliability. The

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mean intraclass correlation coefficient (absolute agreement) for number of non-compliant events was .97 (range .92 to 1.00), for physical control .93 (range .83 to .99). So, both variables used for the relative physical control measure had high intercoder reliability. During the coding process regular meetings with coders were organized to prevent coder drift.

**Child aggression.** At Time 1 and 2 the Child Behavior Checklist for preschoolers (CBCL/1½-5; Achenbach & Rescorla, 2000; Koot, Van den Oord, Verhulst, & Boomsma, 1997) was used to measure aggressive behavior. For the current study we used a modified version of the narrowband scale, aggressive behavior (Alink et al., 2006; Koot et al., 1997; see Appendix B for items), which has been proven a reliable and valid measure for aggressive child behavior in the Dutch context (Koot et al., 1997). Aggressive behavior was defined as any behavior through which a child (potentially) causes harm or hindrance to someone or something else (Orobio de Castro, Veerman, Koops, Bosch, & Monshouwer, 2002). Both fathers and mothers indicated whether they had observed any of the described 14 aggressive behaviors in the last two months on a 3-point scale (0 = *not true*, 1 = *somewhat or sometimes true*, 2 = *very true or often true*). Total scores could range from 0 to 28, with higher scores indicating more aggression. The internal consistencies (Cronbach's alpha) of the aggression scale were .84 at Time 1 and .85 at Time 2 for fathers and mothers. In the current study, 24 children had missing data on the CBCL aggression scale at Time 2. These missing values were predicted from Time 1 CBCL aggression scores using linear regression. Analyses with and without imputed values yielded similar results, so the imputed values were retained in the current data set. Child aggression at Time 1 and Time 2 was unrelated to child non-compliance in the *don't-touch-task* ( $r_s < .05$ ,  $p_s > .40$ ).

### Procedure

Each family was visited twice at each time point; once observing the mother and the two children and once observing the father and the two children, with an intervening period of

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about two weeks. The order in which fathers and mothers were visited was counterbalanced. Families received a payment of 30 Euros after two visits and small presents for the children. Before the first home-visit both parents were asked to individually complete a set of questionnaires (e.g., about the child's temperament, internalizing and externalizing behavior, empathy). During the home visits parent-child interactions and sibling interactions were filmed, and both children and parents completed computer tasks. We observed parent and child behaviors such as child prosocial behavior and non-compliance, and parental sensitivity, verbal control, gender talk, and emotion talk. All visits were conducted by pairs of trained graduate or undergraduate students. Informed consent was obtained from all participating families. Ethical approval for this study was provided by the Committee Research Ethics Code of the Leiden Institute of Education and Child Studies.

### **Results**

The following study variables were used in the analyses; child gender, Time 1 implicit gender-role attitudes (mother & father), Time 1 physical control (mother & father) of boys and girls, Time 1 and 2 aggression of boys and girls. Descriptive analyses were conducted to examine associations between study variables and possible covariates, such as mothers' and fathers' educational level, working hours, and time spent with child. Separate hierarchical regression analyses for mothers and fathers were used to test whether the association between child gender and parents' use of physical control strategies was moderated by parents' attitudes toward gender roles (Hypothesis 1). Hypothesis 1 was also tested for mothers and fathers together in a multi-level analysis. The moderated mediation model presented in Figure 1 (Hypothesis 2) was tested separately for mothers and fathers with the SPSS Macro for moderated mediation (Preacher, Rucker, & Hayes, 2007).

### **Data Inspection**

All variables were inspected for possible outliers that were defined as values more than 3.29 *SD* below or above the mean (Tabachnick & Fidell, 2012). Outliers ( $n = 3$ ) were winsorized by giving them a marginally higher value than the most extreme not outlying value (Tabachnick & Fidell, 2012). The aggression variables were not normally distributed and therefore square-root transformation was used to approximate normal distributions (Tabachnick & Fidell, 2012). A scatter matrix was used to detect possible bivariate outliers, but none were detected.

The frequency and relative scores of physical discipline were correlated for both mother ( $r = .65, p < .01$ ) and father ( $r = .60, p < .01$ ), indicating that parents who most frequently used physical control were also the parents who received a high score on the proportion measure. Because of these high correlations we also adjusted the relative scores for frequency scores by saving the residuals from a regression with relative scores being predicted from frequency scores. Analyses using these adjusted scores yielded the same results as the relative scores. Therefore, we only present results with relative scores.

The CBCL scores of fathers and mothers on aggression were significantly correlated (Time 1:  $r(297) = .59, p < .01$ ; Time 2:  $r(297) = .47, p < .01$ ) and did not differ significantly from each other (Time 1:  $t(298) = 0.47, p = .64$ ; Time 2:  $t(298) = 1.29, p = .20$ ). To obtain a composite measure for aggressive behavior, father and mother scores were summed per time point. Results were similar when mother and father report were used separately in the analyses.

### **Descriptive Analyses**

Table 1 displays the descriptive statistics and correlations for all study variables. On average mothers and fathers had slightly traditional gender-role stereotypes, i.e., small positive mean scores (mother:  $M = 0.35, SD = 0.43$ ; father:  $M = 0.28, SD = 0.38$ ), indicating more difficulty with pairing career concepts with females and family concepts with males.



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They used physical control in about 50% of the child's non-compliant events (mother:  $M = 0.46$ ,  $SD = 0.33$ ; father:  $M = 0.42$ ,  $SD = 0.34$ ). Average child aggression was low in our sample (Time 1:  $M = 4.27$ ,  $SD = 2.95$ ; Time 2:  $M = 4.52$ ,  $SD = 3.01$ ), similar to levels of child aggression in other non-risk community samples (e.g., Alink et al., 2006; Crijnen, Achenbach, & Verhulst, 2014).

**Background variables.** To examine parent and child gender differences in background variables, repeated-measures analyses of variance (with child gender included as a between-subjects variable, and mother-father as within-subject variables to take into account non-independence) were conducted. We only found significant main effects of parent gender. Mothers were higher educated than fathers, *Pillais F* (1, 297) = 5.61,  $p < .05$ ,  $\eta_p^2 = .02$ , mothers spent more time with their children than fathers, *Pillais F* (1, 207) = 17.32,  $p < .01$ ,  $\eta_p^2 = .08$ , and mothers worked less hours outside the home than fathers, *Pillais F* (1, 297) = 256.75,  $p < .01$ ,  $\eta_p^2 = .46$ . Regular analyses of variance indicated that there were no differences between the family types (two boys, two girls, boy-girl, girl-boy) for parents' stereotypes (mothers:  $F(3, 295) = 0.85$ ,  $p = .47$ ; fathers:  $F(3, 295) = 2.44$ ,  $p = .07$ ). Significant differences between the family types were found for child aggression (Time 1:  $F(3, 295) = 3.30$ ,  $p < .05$ ; Time 2:  $F(3, 295) = 4.10$ ,  $p < .01$ ) and parents' physical control (mothers:  $F(3, 295) = 3.22$ ,  $p = .47$ ; fathers:  $F(3, 295) = 3.03$ ,  $p < .05$ ). Post hoc tests indicated that in families with two boys the oldest child was more aggressive (Time 1:  $M = 2.12$ ,  $SD = 0.72$ ; Time 2:  $M = 2.19$ ,  $SD = 0.70$ ) than in families with an oldest girl and a youngest boy (Time 1:  $M = 1.81$ ,  $SD = 0.72$ ; Time 2:  $M = 1.80$ ,  $SD = 0.68$ ,  $ps < .05$ ). Mothers with two boys ( $M = 0.53$ ,  $SD = 0.31$ ) used more physical control than mothers with two girls ( $M = 0.37$ ,  $SD = 0.33$ ,  $p < .05$ ). Fathers with two girls ( $M = 0.32$ ,  $SD = 0.30$ ) used less physical control than fathers with an oldest girl and a younger boy ( $M = 0.47$ ,  $SD = 0.35$ ,  $p < .05$ ). Some of the study variables were significantly related to background variables (see Table

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1). Analyses with and without the background variables as covariates yielded similar results. Results were also similar in the different family types.

**Mean-level gender differences.** To examine gender differences among key variables, change in aggressive behavior from Time 1 to Time 2, and differences between mothers and fathers, repeated-measures analyses of variance (with child gender included as a between-subjects variable, and mother-father and Time 1-Time 2 included as within-subject variables to take into account non-independence) were conducted. Regarding parent and child gender differences on the study variables, mothers had significantly stronger gender-role stereotypes than fathers, *Pillais F* (1, 297) = 5.66,  $p < .05$ ,  $\eta_p^2 = .02$ . Child gender was not associated with parental gender stereotypes, *Pillais F* (1, 297) < 0.01,  $p = .95$ ,  $\eta_p^2 < .01$ . Mothers and fathers did not differ in their mean levels of physical control, *Pillais F* (1, 297) = 1.78,  $p = .18$ ,  $\eta_p^2 = .01$ . Parents used significantly more physical control with boys than with girls, *Pillais F* (1, 297) = 5.11,  $p < .05$ ,  $\eta_p^2 = .02$ , which was accounted for by mothers,  $t(297) = 2.67$ ,  $p < .01$ ,  $d = 0.31$  (fathers:  $t(297) = 0.83$ ,  $p = .41$ ). Boys were more aggressive than girls at Time 1 and 2, *Pillais F* (1, 297) = 9.72,  $p < .01$ ,  $\eta_p^2 = .03$ , and no mean-level changes in aggression between time points were found, *Pillais F* (1, 297) = 2.80,  $p = .10$ ,  $\eta_p^2 = .01$ . There were no interactions between parent and child gender.

**Correlations between study variables.** Mothers' gender-role stereotypes were significantly associated with fathers' gender-role stereotypes, and mothers' use of physical control strategies was associated with fathers' use of physical control strategies. Parental stereotypes were not associated with physical control or with child aggression, neither for mothers nor for fathers. We also computed correlations between parents' gender-role stereotypes and child aggression separately for boys and girls, to rule out the possibility that parent report of child aggression to some extent reflect gender-role stereotypes (i.e., parents with more stereotypical gender-role attitudes report more aggression in boys compared to

girls). Correlations between parents' gender-role stereotypes and child aggression were similar and not significant for boys and girls at both time points ( $r$ s between  $-.11$  and  $.05$ ,  $p$ s between  $.15$  and  $.99$ ). More use of physical control by fathers (during Time 1) was associated with more child aggression a year later (Time 2), whereas mothers' greater use of physical control (during Time 1) was related to more child aggression at both Time 1 and at Time 2. Time 1 and Time 2 child aggression were highly correlated.

### **Moderation Models**

To examine the first hypothesis that the association between child gender and parental physical control was moderated by parental gender-role stereotypes, separate hierarchical regression analyses were conducted for mothers and fathers, with the inclusion of the dichotomous variable child gender (0 = boy, 1 = girl) and the centered variable parental gender-role stereotypes in the first step, and the interaction between the two variables added in the second step. Because mothers and fathers are nested within families, a multilevel mixed model analysis was also conducted for mothers and fathers together to take into account the non-independence between mother and father scores. For this analysis the predictors parental gender-role stereotypes, parent gender and child gender (0 = male, 1 = female) were entered in the first step, and the interactions (child gender\*stereotypes, parent gender\*stereotypes, child gender\*parent gender, parent gender\*child gender\*stereotypes) were added in the second step. The results of this analysis were similar to the results of the separate hierarchical regression analyses for mothers and fathers, and therefore we only present results of the more comprehensible regression analyses.

Child gender ( $\beta = -.05$ ,  $p = .38$ ) and fathers' gender-role stereotypes ( $\beta = -.05$ ,  $p = .38$ ) did not predict fathers' use of physical control in the first step ( $R^2 = .00$ ,  $p = .53$ ). In step 2, the association between child gender and fathers' use of physical control was significantly moderated by fathers' gender-role stereotypes ( $\beta = -.23$ ,  $p < .01$ ,  $\Delta R^2 = .03$ ,  $p < .01$ ). Fathers

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with strong stereotypical attitudes toward gender roles used more physical control with boys ( $M = 0.54$ ;  $SD = 0.31$ ) than with girls ( $M = 0.42$ ;  $SD = 0.32$ ), whereas fathers with strong counter-stereotypical attitudes toward gender roles used more physical control with girls ( $M = 0.48$ ;  $SD = 0.36$ ) than with boys ( $M = 0.41$ ;  $SD = 0.33$ ).

For mothers there was only a significant association between child gender and mothers' use of physical control ( $\beta = -.15$ ,  $p < .01$ ), indicating that mothers used more physical control with boys than with girls, irrespective of their gender stereotypes. Mothers' gender-role stereotypes did not predict mothers' use of physical control in the first step ( $\beta = .04$ ,  $p = .50$ , step 1  $R^2 = .03$ ,  $p < .05$ ). The interaction between child gender and mothers' gender-role stereotypes was not significant and did not improve the model ( $\beta = -.13$ ,  $p = .11$ ,  $\Delta R^2 = .01$ ,  $p = .11$ ). In sum, partial support was found for the first hypothesis; only for fathers the association between child gender and parental physical control was moderated by parental gender-role stereotypes. Mothers' greater use of physical control with boys than with girls was not moderated by her gender-role stereotypes.

### **Moderated Mediation**

A moderated mediation analysis (Preacher, Rucker, & Hayes, 2007) was performed to examine the second hypothesis that parental gender-role stereotypes moderated the indirect effect of child gender, through parental physical control, on aggression (at Time 1 and at Time 2, while controlling for aggression at Time 1; see Figure 1). With moderated mediation one can test whether an indirect effect (i.e., mediation) is different for different levels of a moderator of interest. Moderated mediation has the advantage of keeping the moderator continuous. This is especially relevant for a moderator like gender-role attitudes, which is difficult to divide into a priori meaningful categories. This analysis was completed using the MODMED macros (Model 2) provided by Preacher et al. (2007) to obtain bootstrapped confidence intervals (CIs) for moderated indirect effects. Moderated mediation pertains to the

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interaction between gender-role stereotypes and child gender (moderator\*independent variable) affecting the mediator (parental physical control) that is expected to predict child aggression. We applied an extension of the Johnson-Neyman (J-N) technique to moderated mediation (Preacher et al., 2007). This technique tests the significance of the indirect effect within the observed range of values of the moderator and identifies the value of the moderator for which the conditional indirect effect is statistically significant at a set level ( $\alpha = .05$ ). Values of the moderator for which the mediation effect is significant constitute the region of significance. Bootstrapped confidence intervals were used to avoid power problems introduced by the often asymmetric and non-normal sampling distributions of the indirect effect (Preacher & Hayes, 2004). The moderated mediation analysis was conducted separately for mothers and fathers because of prohibitive complications to use a multi-level approach to test such a model.

**Fathers.** Results were the same for the concurrent and longitudinal moderated-mediation model. Therefore, we only present the results of the longitudinal model. The total model (including the moderator, interaction term, and covariates) accounted for 47% of the variance in child aggression ( $R^2 = 0.47, p < .001$ ). This model was examined to determine whether fathers' gender-role stereotypes significantly interacted with child gender to produce differential effects of the predictor (i.e., child gender) on the mediator (i.e., fathers' use of physical control) controlling for aggression of the child at Time 1. Specifically, we wanted to test the hypothesis that fathers' use of physical control mediates the relation between child gender and later aggressive behavior when fathers' gender-role attitudes are highly stereotypical or highly counter-stereotypical.

Two regression analyses were conducted to test the moderated mediation hypothesis. In Table 3 normal theory tests (i.e.,  $p$ -values) are provided for the moderator and mediator model. For the conditional indirect effects at different levels of gender-role stereotypes

bootstrapped standard errors are presented (see Table 3 and Figure 2). In the mediator variable model, which is similar to the simple moderation model that was conducted in SPSS, fathers' gender-role stereotypes predicted fathers' use of physical control, whereas child gender did not. The significant interaction between child gender and fathers' gender-role stereotypes, that was also found in the moderation analysis in SPSS, suggests that the indirect effect of child gender on later aggression through fathers' use of physical control might be moderated by fathers' gender-role stereotypes. The dependent variable model provided further evidence for a moderated indirect effect, since child aggression at Time 2 was significantly predicted by fathers' use of physical control, over and above the effect of aggressive behavior at Time 1.

The results of the J-N technique (see Figure 2, Appendix C for statistics), provided further evidence of a moderated indirect effect, showing that if fathers have strong stereotypical ideas about gender roles the indirect effect of child gender, through fathers' use of physical control, on later child aggressive behavior, is significant. When fathers have strong counter-stereotypical attitudes toward gender roles the indirect effect was also significant. The negative values for the indirect path for fathers with stereotypical gender-role attitudes indicate that they used more physical control with boys than with girls, which was related to more aggression in these boys a year later. The positive values for the indirect path for fathers with strong counter-stereotypical attitudes toward gender roles indicate that they used more physical control with girls than with boys, which was related to more aggression in these girls a year later. Since the direct effect from child gender to aggressive behavior was no longer significant in the moderated mediation model, gender differences in child behavior were completely accounted for by the differential father-child interaction patterns observed in fathers with strong stereotypical or counter-stereotypical attitudes toward gender roles.

The critical values of fathers' gender-role stereotypes at which the indirect effect became significant were 0.50 on the stereotypical side (88 fathers in our sample) and -0.21 on

the counter-stereotypical side (37 fathers in our sample). The remaining fathers ( $n = 174$ ) can be considered to have more egalitarian gender-role attitudes. Table 4 displays descriptive statistics for the three groups of fathers on gender-differentiated physical control and aggression of boys and girls, indicating that fathers with egalitarian attitudes differentiated the least between boys and girls with regard to physical control. The gender differences in child aggression at Time 2 were the smallest in the groups of fathers with counter-stereotypical and egalitarian attitudes. The three groups were not different in educational level,  $F(2, 296) = 1.86, p = .16$ , working hours,  $F(2, 296) = 1.83, p = .16$ , or time spent with the child,  $F(2, 234) = 0.67, p = .51$ .

**Mothers.** For mothers the moderated mediation model did not fit the data, because mothers' gender-role stereotypes did not moderate the association between child gender and mothers' use of physical control. Therefore, we applied the Preacher and Hayes approach to test mediation using the macro package for SPSS available online to examine the direct and indirect effects of the predictors (i.e., child gender, mothers' use of physical control) on child aggressive behavior at Time 1 and 2 (Hayes, 2013). This method adopts the bootstrapping approach that does not assume that the sampling distributions of the indirect effect are normal, unlike the traditionally used Sobel test (Preacher & Hayes, 2004). Five thousand bootstrap resamples were used and 95% BC confidence intervals were computed.

When tested concurrently, the indirect path from child gender, through mothers' use of physical control, to child aggressive behavior was significant,  $B = -0.02, S.E. = 0.02, BC\ CI = -0.068, -0.001$ . The direct effect from child gender to child aggression with the mediator included was still significant,  $B = -0.22, S.E. = 0.09, p < .05$ , but smaller than without the mediator,  $B = -0.24, S.E. = 0.09, p < .01$ . When tested longitudinally, the indirect path from child gender, through mothers' use of physical control, to child aggressive behavior was not significant,  $B = -0.003, S.E. = 0.01, BC\ CI = -0.027, 0.013$ .

In sum, evidence for the second hypothesis was only found for fathers. Fathers' gender-role stereotypes moderated the indirect effect of child gender, through parental physical control, on aggression. Mothers' gender-differentiated use of physical control only accounted for gender differences in child aggression concurrently, but not longitudinally, and this effect was not moderated by mothers' gender-role stereotypes.

### **Discussion**

The current study partially confirmed our hypothesis that parents' gender-differentiated use of physical control is dependent on their gender-role attitudes, as this was only the case for fathers. Moreover, when fathers' implicit attitudes toward gender roles were strongly stereotypical or strongly counter-stereotypical, their differential treatment of boys and girls was related to children's aggressive behavior a year later. Mothers used more physical control strategies with boys than with girls, regardless of their level of gender-role stereotypes. Although physical control by both mothers and fathers was related to child aggression a year later, mothers' gender-differentiated control was unrelated to gender differences in aggressive behavior a year later.

As expected, the association between child gender and the use of father's physical control strategies was influenced by his implicit attitudes toward gender roles. These results converge with evidence of the link between attitudes toward gender and actual gender-related behavior (Bem, 1981; Endendijk et al., 2013; Gelman et al., 2004; Friedman et al., 2007). Fathers with strong stereotypical attitudes toward gender roles use more physical control with boys than with girls. As a consequence boys might be socialized into a more masculine role, characterized by assertiveness, power, and dominance (Eagly et al., 2000; Hosley & Montemayor, 1997), because they will learn that using physical strategies is effective in getting one's own way (Bandura, 1977). On the other hand fathers with strong counter-stereotypical attitudes toward gender roles (i.e., associating women strongly with career and



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men with family) show the opposite gender-differentiated parenting practices. By using more physical control with girls than with boys, these girls might be socialized towards a more masculine role than boys (Bandura, 1977; Eagly et al., 2000; Hosley & Montemayor, 1997). These fathers appear to encourage power assertive behaviors more in girls than in boys.

Surprisingly little is known about counter-stereotypical gender-role attitudes and associated gender-related behaviors. There is evidence from one study that highly non-traditional gender-role attitudes can be a reflection of fathers' own gender roles (i.e., highly involved in child care, McGill, 2011). However, in the current study data on child care involvement was only available at Time 2, and it was unrelated to fathers' gender-role stereotypes at Time 1. Future research should incorporate measures of parents' own gender roles and division of labor in and outside the home to further elucidate the development of counter-stereotypical attitudes and the behaviors associated with these attitudes. As opposed to fathers with strong traditional or counter-stereotypical attitudes, fathers with more egalitarian implicit gender-role attitudes (about 60% of our sample) treated boys and girls more similarly.

Our results suggest that gender-differentiated parenting practices indeed have important consequences for later child behavior. Fathers' differential treatment of boys and girls was related to children's aggressive behavior a year later, but only when fathers' attitudes toward gender roles were strongly stereotypical or strongly counter-stereotypical. Using physical control strategies more often with boys than with girls by fathers with traditional gender-role attitudes was related to higher levels of aggression in boys than in girls a year later. By using physical control in response to children's non-compliance, fathers are not only models for aggressive behavior (Bandura, 1977), they also risk ending up in a coercive cycle with their children (Patterson, 1982).

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On the other hand, more physical control strategies with girls than with boys as used by fathers with counter-stereotypical attitudes was related to more aggression in girls a year later, as evidenced by smaller and nonsignificant gender differences in aggression. These results imply that fathers might employ the gender-differential use of physical control strategies to encourage their children to show behavior that is consistent with their attitudes toward gender roles (i.e., stereotypical or counter-stereotypical). Our finding that fathers' differential use of physical control strategies with boys and girls completely accounted for the relation between child gender and child aggressive behavior also provides evidence for the idea that gender-differentiated parenting is an important mechanism underlying gender differences in children's behavior (Chaplin et al., 2005; Mandara et al., 2012, Tamis-LeMonda, Briggs, McClowry, & Snow, 2009).

Interestingly, the association between child gender and maternal use of physical control strategies appeared to be less dependent on mothers' attitudes toward gender roles. Overall, mothers used more physical control strategies with boys than with girls, which is consistent with findings from previous studies (e.g., Bezirgianian & Cohen, 1992; Eron, 1992; Whiting & Edwards, 1973). Apparently, for mothers there is a less strong link between attitudes toward gender and differential behavior towards boys and girls, which converges with previous evidence that men are more concerned about acting in accordance with attitudes toward gender roles than women (Fischer & Arnold, 1994; Hort, Fagot, & Leinbach, 1990).

Mothers' differential use of physical strategies with boys versus with girls was also unrelated to boys' and girls' aggressive behavior a year later. This might seem somewhat surprising in light of the recent review by Fagan, Day, and Lamb (2014) suggesting similar influence of fathers' and mothers' parenting on child outcomes. However, this review did not specifically focus on parental gender socialization practices. Our results are in line with previous studies on gender-differentiated parenting in relation to child outcomes. For

example, there is ample evidence that fathers are more involved with gender socialization practices such as gender-differentiated parenting than mothers and that fathers have a stronger influence on children's gender development (e.g., Chaplin and colleagues, 2005; Lytton & Romney, 1991; McHale, Crouter, & Whiteman, 2003). In the same vein, Mandara and colleagues (2012) found associations between mothers' gender-differentiated use of positive parenting practices, such as sensitivity and responsiveness, and later child behavior, but no associations for more negative practices such as control. Mothers may make more use of positive parenting strategies to socialize their children into the expected gender roles, while fathers may use more negative strategies for gender socialization (Russel et al., 1998). As a result, mothers' attitudes toward gender may be more strongly related to their differential use of *positive* parenting strategies, rather than any gender-differentiated use of *negative* strategies. We did find that mothers' physical control mediated the association between child gender and aggression concurrently, which could be alternatively explained in terms of a child effect, i.e., boys' higher levels of aggressive behavior eliciting more physical control from their mothers.

The lack of associations between implicit stereotypes and maternal gender-differentiated use of control could also imply that that mothers adapt their gender-differentiated parenting more to societal gender roles and norms of appropriate behavior for boys and girls than to their own gender-role attitudes. Recall that mothers in the current study used more physical control with boys than with girls, which fits with the idea that parenting behavior towards boys would be more likely to focus on assertiveness and dominance, because these characteristics are important to succeed in boys' future roles as economic providers (Eagly et al., 2000). Variance in whether mothers parent boys and girls in line with their own gender-role attitudes might diminish the impact of their parenting behavior on their children's future aggression. There is indeed evidence that suggests that congruence between

parental attitudes and parental behaviors is an important factor to take into account when examining parenting in relation to child behavior (Sparks, Thornburg, Ispa, & Gray, 1984).

As we examined mothers and fathers within families, the findings need to be interpreted in the context of the family as a system with both mother and father influencing the child's behavior. In this light, our results could indicate that mothers' gender-differentiated use of physical control played a more indirect role in child aggression. The group of mothers as a whole used more physical discipline with boys than with girls (regardless of her gender stereotypes, see Table 1). This means that in families with fathers with traditional gender-role attitudes, boys receive a double dose of physical discipline (from both mother and father), which might explain the gender difference in aggression a year later. In families with fathers with more egalitarian attitudes, who use similar amounts of physical control with boys and girls, boys only receive more physical control from their mothers. This might explain that in these families there is still a significant, albeit small, gender difference in aggression. In families with fathers with counter-stereotypical attitudes, girls receive more physical control from their fathers, but boys receive more physical control from their mothers. This might explain that in these families there is no gender difference in aggression a year later. Thus, mothers' gender-differentiated use of physical control might modify the influence of fathers' gender-differentiated use of physical control on gender differences in child aggression.

We also found some unexpected results that might be typical for the Dutch sample. The findings that the group of fathers as a whole did not show gender-differentiated physical control and that a substantial number of fathers had counter-stereotypical attitudes about gender roles, might be attributable to the high level of father involvement and participation of mothers in the labor market in the Netherlands (Cousins & Ning, 2004; Devreux, 2007). The gender-equal environment in families with an equal distribution of child care and labor tasks

may have led to more egalitarian or even counter-stereotypical attitudes about gender which in turn influenced fathers' parenting behavior. The finding that mothers had stronger implicit gender-role attitudes than fathers might not be specific for the Dutch society, because a previous study conducted in the US also found that women have stronger implicit attitudes and men have stronger explicit attitudes (Nosek et al., 2002).

Last, in the current study sibling gender (i.e., presence of same-gender or opposite-gender sibling within the family) did not affect the association between gender-differentiated physical control and gender differences in child aggression. We only found differences between families with same-gender children or opposite-gender children in specific parent and child behaviors. This is consistent with previous research showing that sibling gender configuration influences individual parent and child behaviors but does not necessarily play a role in the association between parenting and child behavior (e.g., McHale, Updegraff, Jackson-Newsom, Tucker, & Crouter, 2000; Rust, Golombok, Hines, Johnston, & Golding, 2000).

This study has some limitations. First, harsh physical control strategies, like spanking, rarely occurred in our sample, which might be due to the observation setting in which the dyads were closely monitored by a home visitor with a camera, or to the high number of highly educated parents who generally use less harsh parenting practices than parents from a lower socioeconomic status (Hoff, Laursen, & Tardif, 2002). Also, child aggression may have been underreported in our highly educated sample. Direct observation of child aggressive behavior would overcome this issue. However, differences in the treatment of boys and girls were still found, as were meaningful associations with later gender differences in child aggression. Second, although it was a strength of the current study that our coding system was based on parental control in response to child non-compliance (i.e., physical control generally only occurs when there is a conflict between the wishes of the parent and those of the child),

almost 20% of the families were excluded from the sample because the child did not show any non-compliance. This has left us with the more disruptive part of our sample, reducing the generalizability of our results. Parents may use less gender-differentiated control with boys and girls who show lower levels of disruptive behavior, or associations between gender-differentiated control and gender differences might be different in a more mixed sample. Third, although the IAT is less prone to social desirability than self-report of gender-role stereotypes, this measure has some limitations. For example, it is unknown whether implicit tasks measure an individual's own stereotypes or culturally shared associations. Moreover, IAT effects appear to be context dependent (for a review see De Houwer, 2002). However, in our study correlations over a year were small but significant, indicating at least some stability. Finally, we adopted a between-family design to examine differences in parenting boys and girls. With this approach parenting in families with boys is compared with parenting practices in families with girls. An important limitation of this approach is that differences in parenting practices do not necessarily reflect a gender difference in the offspring, but may also be related to other family characteristics. It is thus of vital importance to also examine gender-differentiated parenting longitudinally in a within-family design, by comparing boys and girls within families at the same age. Unfortunately, we were not able to test the moderated mediation model within a multilevel analysis of time within children within families, with both parent and child gender as predictors, because that model was too complex to fit our data.

Despite these limitations our results provide important implications and directions for future research. First, the current study provides support for the theoretical assumptions of gender schema theory (Bem, 1981) and for the link between parents' gender-related attitudes and actual gender socialization of their children. Previous evidence in this area has been surprisingly weak (e.g., Fagot, Leinbach, & O'Boyle, 1992; Tenenbaum & Leaper, 2003),

possibly because parents' attitudes were often assessed explicitly, whereas implicit stereotypes may be better predictors of behavior (Nosek et al., 2002). Second, our study highlights the importance of taking into account parents' implicit gender stereotypes when examining gender-differentiated parenting or gender socialization, since parents with egalitarian, strongly stereotypical, or strongly counter-stereotypical attitudes toward gender roles differ substantially in their parenting practices towards boys and girls. Parents at both extremes of the distribution (i.e., highly stereotypical, highly counter-stereotypical) showed the largest differences in the treatment of boys and girls. Third, even the more subtle forms of physical control strategies, such as grabbing, pushing, holding, or physically redirecting (representing most of the physical control acts in this study), predict aggression in children, suggesting a strong role for modeling and social learning (Bandura, 1977). Most importantly, gender-differentiated parenting indeed appears to be an important mechanism underlying gender differences in children's behavior. When fathers had strong traditional or counter-stereotypical attitudes toward gender roles, their differential use of physical control strategies with boys and girls completely accounted for later gender differences in child aggressive behavior. From a family-system perspective, mothers' gender-differentiated parenting might play a more indirect role as compared to the influence of fathers' gender-differentiated parenting on the development of child aggression.

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Table 1

*Descriptive Statistics and Correlations for all Study Variables (N = 299).*

	1	2	3	4	5	6	7	8	9	10	11	12
1.Stereotypes F T1												
2.Stereotypes M T1	.26**											
3.Physical control F T1	.04	.06										
4.Physical control M T1	.05	.05	.18**									
5.Child aggression T1	.02	.02	.08	.12*								
6.Child aggression T2	-.06	-.07	.13*	.12*	.64**							
7. Educational level F T1	.04	-.02	-.02	-.17**	-.07	-.12*						
8. Educational level M T1	.04	-.01	-.10	-.08	-.07	-.09	.43**					
9. Working hours F <sup>1</sup> T1	.11	.12*	.05	.07	.10	.14*	-.11	-.15*				
10. Working hours M <sup>1</sup> T1	.03	.02	-.14*	-.14*	-.05	.03	.20**	.36**	-.21**			
11. Time with child F <sup>2</sup> T2	-.04	-.06	-.06	.08	-.09	.04	-.18**	-.01	-.12	.01		
12. Time with child M <sup>2</sup> T2	-.01	.09	.09	.11	.08	-.04	-.04	-.06	.13	-.26	.02	
Total sample: <i>M (SD)</i>	0.28 (0.38) <sup>c</sup>	0.35 (0.43) <sup>d</sup>	0.42 (0.34)	0.46 (0.33)	4.27 (2.95)	4.52 (3.01)	4.09 (0.90) <sup>c</sup>	4.21 (0.78) <sup>d</sup>	37.60 (7.26) <sup>c</sup>	25.59 (9.27) <sup>d</sup>	7.70 (3.96) <sup>c</sup>	9.35 (4.47) <sup>d</sup>
Boys only: <i>M (SD)</i>	0.26 (0.37)	0.37 (0.43)	0.44 (0.34)	0.50 (0.32) <sup>a</sup>	4.73 (3.10) <sup>a</sup>	4.99 (2.97) <sup>a</sup>	4.08 (0.90)	4.19 (0.78)	37.49 (7.10)	25.15 (9.21)	8.01 (4.17)	9.55 (4.39)
Girls only: <i>M (SD)</i>	0.31 (0.39)	0.33 (0.42)	0.40 (0.34)	0.40 (0.33) <sup>b</sup>	3.78 (2.72) <sup>b</sup>	4.02 (2.99) <sup>b</sup>	4.10 (0.91)	4.24 (0.76)	37.70 (7.43)	26.06 (9.34)	7.42 (3.74)	9.16 (4.56)

*Note.* Abbreviations are Mother (M), Father (F), Time 1 (T1), Time 2 (T2). Child gender effect: <sup>a</sup> and <sup>b</sup> differ significantly,  $p < .05$ , Parent gender effect: <sup>c</sup> and <sup>d</sup> differ significantly,  $p < .05$ . Means (*M*) and standard deviations (*SD*) are presented for the whole sample and separately for boys and girls. Range of scores of stereotypes: -2 to +2, physical control: 0 to 1, and child aggression: 0 to 28, educational level: 0 (primary/secondary school only) to 5 (university degree).

<sup>1</sup> in hours per week. <sup>2</sup> in hours per day.

\* $p < .05$ , \*\* $p < .01$

Table 2

*Multilevel Model Predicting Parents' Physical Control.*

	Parents' physical control		
	<i>b</i>	<i>SE</i>	<i>t</i>
Child gender	-.04	.04	-1.10
Parent gender	.05	.03	1.53
Parents' gender-role stereotypes	.07	.03	2.44*
Parent gender*Child gender	-.05	.05	-1.08
Child gender*Parents' gender-role stereotypes	-.11	.04	-2.79**
Parent gender*Parents' gender-role stereotypes	-.03	.04	-0.89
Parent gender*Child Gender*Parents' gender-role stereotypes	.05	.05	1.03

*Note.* These analyses only pertain to the moderation part of the moderated mediation model; Effects are reported as unstandardized regression coefficients; Gender: 0 = male, 1 = female.

\*  $p < .05$ , \*\*  $p < .01$ .

Table 3

*Indirect Effect of Child Gender on Aggression, via Fathers' use of Physical Control,  
Moderated by Fathers' Gender-Role Stereotypes*

Mediator variable model (predicting fathers' physical control T1)				
Predictor	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Constant	0.36**	0.06	5.89	.00
Child aggression T1	0.04	0.03	1.57	.12
Child gender <sup>a</sup>	-0.02	0.04	-0.61	.54
Fathers' gender-role stereotypes T1	0.07*	0.03	2.44	.02
Child gender*Fathers' gender-role stereotypes T1	-0.11**	0.03	-2.79	.01
Dependent variable model (predicting child aggression T2)				
Predictor	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Constant	0.72**	0.10	6.96	.00
Child aggression T1	0.64**	0.04	14.99	.00
Child gender <sup>a</sup>	-0.10	0.06	-1.52	.13
Fathers' gender-role stereotypes T1	-0.12**	0.04	-2.66	.01
Child gender*Fathers' gender-role stereotypes T1	0.13*	0.06	2.03	.04
Fathers' physical control T1	0.19*	0.09	1.98	.04

*Note.* Abbreviations are Time 1 (T1), Time 2 (T2). Bootstrap  $N = 5000$ . Unstandardized coefficients are shown. BCaL95 = 95% confidence interval lower limit. BCaU95 = 95% confidence interval upper limit.

<sup>a</sup> child gender: boy=0, girl=1.

\*  $p < .05$ , \*\*  $p < .01$

Table 4

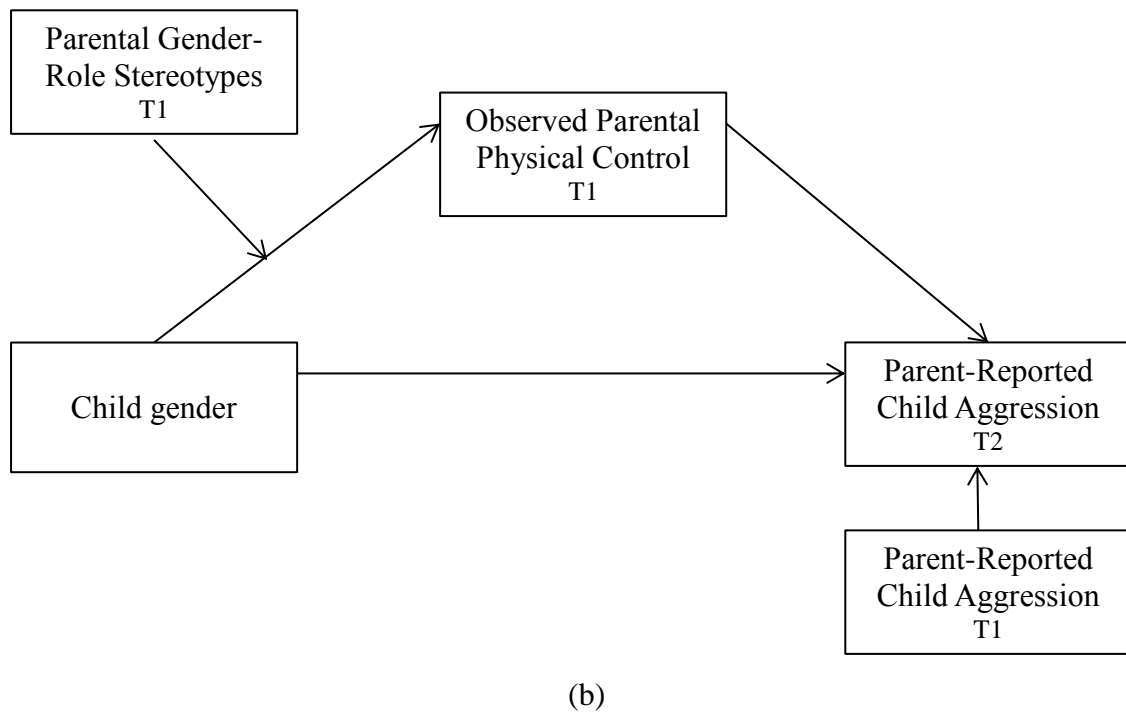
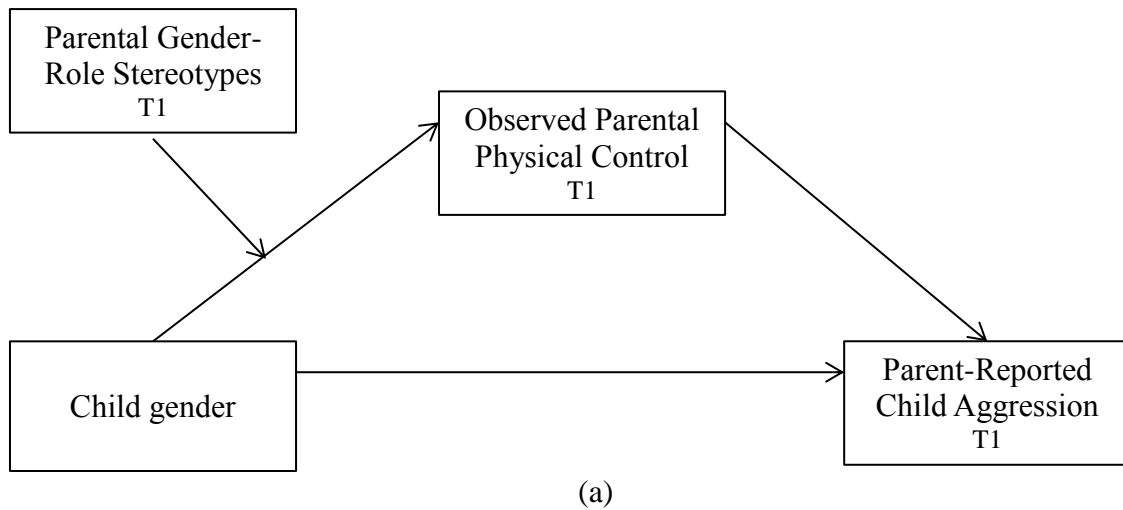
*Gender Differences in Fathers' Physical Control and Child Aggression, Separate for Fathers with Stereotypical, Egalitarian, and Counter-Stereotypical Gender-Role Attitudes.*

	Boys	Girls	
Fathers' gender-role stereotypes T1	<i>M (SD)</i>	<i>M (SD)</i>	<i>d</i> <sup>1</sup> [85% <i>CI</i> ]
Stereotypical Attitude			
Physical control F T1	.53 (.38)	.41 (.33)	0.33 [0.01;0.69]
Child aggression T1 <sup>2</sup>	2.13 (.70)	1.66 (.97)	0.51 [0.16;0.85]
Child aggression T2	2.39 (.66)	1.83 (.84)	0.76* [0.26;1.25]
Egalitarian Attitude			
Physical control F T1	.43 (.33)	.38 (.34)	0.16 [-0.05;0.37]
Child aggression T1	2.02 (.78)	1.86 (.71)	0.22 [0.00;0.43]
Child aggression T2	2.09 (.70)	1.88 (.73)	0.29* [0.09;0.51]
Counter-Stereotypical Attitude			
Physical control F T1	.32 (.28)	.57 (.32)	-0.86* [0.35;1.35]
Child aggression T1	2.06 (.64)	1.74 (.63)	0.57* [0.08;1.06]
Child aggression T2	2.06 (.65)	1.83 (.75)	0.33 [-0.02;0.66]

*Note.* Abbreviations are father (F), Time 1 (T1), Time 2 (T2). The subgroup statistics for the different levels of fathers' gender stereotypes are for explanatory purposes only. As the moderated mediation analysis treats gender stereotypes as a continuous variable, the reader is referred to Figure 2 and Appendix C for significance levels at different levels of fathers' gender stereotypes.

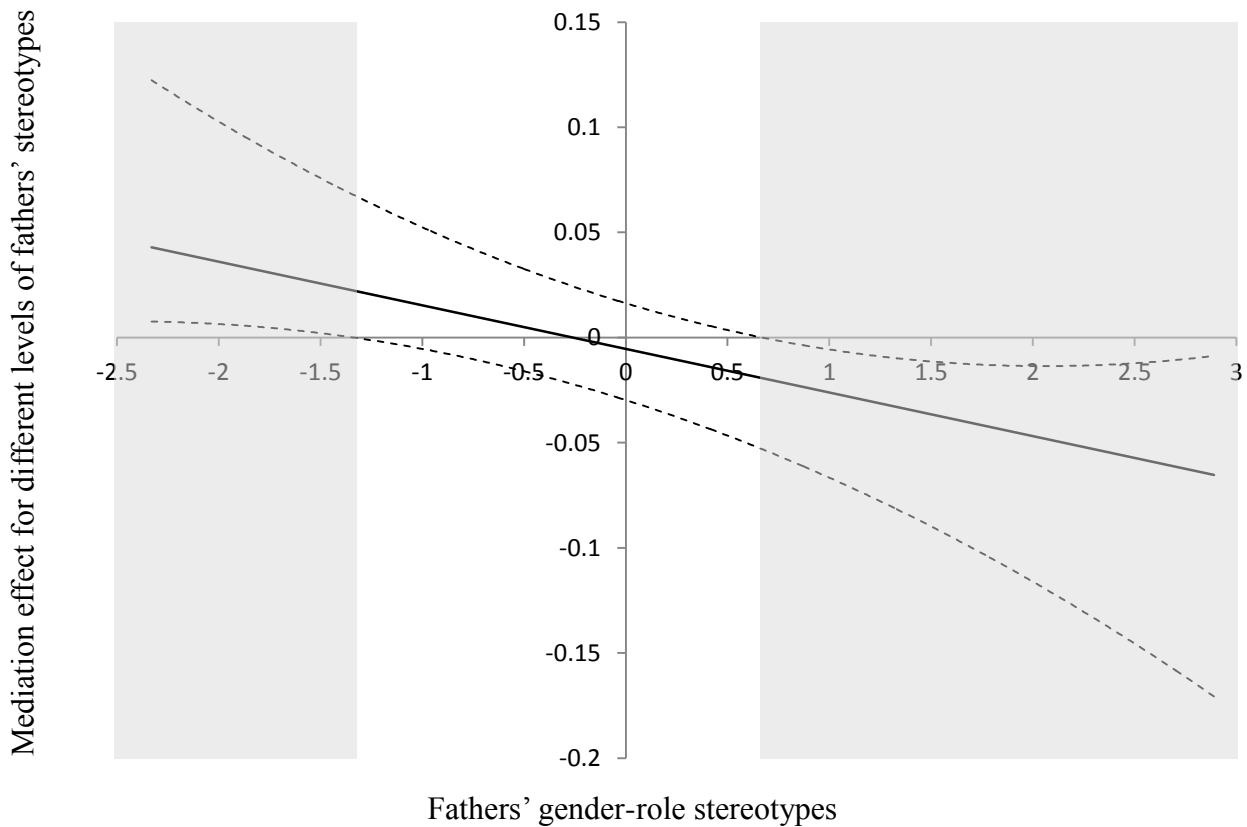
<sup>1</sup> Positive *d* values indicate boys > girls, negative *d* values indicate girls > boys. *d* values and corresponding *CI*s were calculated using SPSS script from Smithson (2003).

<sup>2</sup> Square-root transformed scores.



*Figure 1.* Moderated Mediation Model of Concurrent (a) and Longitudinal (b) Associations between Gender-Differentiated Parenting, Gender Stereotypes, and Gender Differences in Behavior.

*Note.* Abbreviations are Time 1 (T1), Time 2 (T2). Concurrent associations represent associations between parent and child behavior at same time point (T1). Longitudinal associations represent parent behavior at T1 predicting child behavior at T2 (one year later), controlling for child behavior at T1.



*Figure 2.* The indirect association between child gender and child aggression (mediated by fathers' physical control) for different levels of fathers' stereotypes, with bootstrapped 95% confidence bands (dashed lines).

*Note.* The grey areas represent the areas of significance for the complete moderated-mediation model. The plot shows that with moderate to high stereotypical attitudes about gender roles ( $> .55 SD$ ) fathers used more physical control with boys than with girls, and higher paternal physical control in turn predicted more aggressive behavior a year later. In case of high counter-stereotypical attitudes about gender roles ( $< -1.29 SD$ ) fathers used more physical control with girls than with boys, and higher paternal physical control in turn predicted more aggressive behavior a year later.

## *Appendix A*

### Information on Excluded Families

Families were excluded if (1) the oldest child did not show noncompliant behavior during the discipline task with mother or father, thus precluding the observation of parental physical control in response to child behavior ( $n = 76$ ), (2) neither parent had completed the Child Behavior Checklist (see Instruments) at both time points of data collection ( $n = 11$ ), and (3) when families had a missing value on the gender stereotype task due to computer failure or data logging problems ( $n = 4$ ). The included families did not differ from the excluded families in any of the background variables or on parental gender-role stereotypes (all  $ps > .23$ ). The children who did not show noncompliant behavior during our observation procedure were not different from the children who did show noncompliant behavior on our dependent variable: aggressive behavior at Time 2,  $t(378) = -0.90, p = .37$ . However, at Time 1 included children ( $M = 4.27, SD = 2.95$ ) were somewhat more aggressive than excluded children ( $M = 3.36, SD = 2.60$ ),  $t(373) = -2.46, p < .05$ . Associations between study variables were similar for included and excluded families. The exclusion of compliant children is most likely attributable to learning effects, because children were significantly more compliant during the second visit than during the first visit ( $t(387) = 4.22, p < .01$ ), only 9 children were completely compliant during both visits, and most of the excluded children ( $n = 52$ ) became compliant in the second visit. No effects of visit order were found on parents' use of physical discipline (mothers:  $t(297) = 1.62, p = .11$ ; father:  $t(297) = -0.24, p = .81$ ).

## *Appendix B*

### Specific Items of the Aggression Scale

1. Cruel to animals
2. Destroys own things
3. Destroys other's things
4. Disobedient
5. Fights
6. Hits
7. Accidentally hurts animals or people
8. Attacks people
9. Too loud
10. Take away other's things\*
11. Bites others\*
12. Kicks others\*
13. Threatens to hit other people\*
14. Starts a fight\*

\* Items added from PA-SEC, Alink et al., 2006.



### Appendix C

#### Statistics of the Indirect Effect for Different Levels of Fathers' Gender-Role Stereotypes

Fathers' stereotypes <sup>b</sup>	Mediation effect for different levels of fathers' gender-role stereotypes <sup>a</sup>			
	Boot indirect effect	Boot SE	BCaL95	BCaU95
-2.33 (-0.61)	0.04*	0.03	0.004	0.117
-2.07 (-0.51)	0.04*	0.03	0.003	0.111
-1.81 (-0.41)	0.03*	0.02	0.002	0.095
-1.55 (-0.31)	0.03*	0.02	0.001	0.080
-1.29 (-0.21)	0.02*	0.02	0.000	0.067
-1.03 (-0.11)	0.02	0.01	-0.001	0.055
-0.52 (0.08)	0.01	0.01	-0.008	0.032
0.00 (0.29)	-0.01	0.01	-0.029	0.008
0.55 (0.50)	-0.02*	0.01	-0.053	0.000
1.06 (0.69)	-0.03*	0.02	-0.075	-0.002
1.58 (0.89)	-0.04*	0.02	-0.101	-0.004
2.10 (1.09)	-0.05*	0.03	-0.128	-0.006
2.63 (1.29)	-0.06*	0.04	-0.149	-0.006
2.89 (1.39)	-0.06*	0.04	-0.167	-0.008

*Note.* Bootstrap  $N = 5000$ . Unstandardized coefficients are shown. BCaL95 = 95% confidence interval lower limit. BCaU95 = 95% confidence interval upper limit.

<sup>a</sup> Controlling for child aggression at Time 1. Bias corrected and accelerated (BCa) confidence intervals are reported.

<sup>b</sup> Values represent selected output provided by the Preacher et al. (2007) macro. Z-scores outside brackets, raw scores inside brackets.

\*  $p < .05$